



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7

11201 Renner Boulevard
Lenexa, Kansas 66219

MAR 10 2014

Dr. Robert Moser
Secretary
Kansas Department of Health and Environment
1000 S.W. Jackson, Suite 540
Topeka, Kansas 66612-1368

Dear Dr. Moser:

RE: Approval of TMDL document for Arkansas River

This letter responds to the submission from the Kansas Department of Health and Environment, originally received by the U.S. Environmental Protection Agency, Region 7, on September 27, 2013, for a Total Maximum Daily Load document which contained TMDLs for biology. The Arkansas River was identified on the 2012 Kansas Section 303(d) list as impaired. This submission fulfills the Clean Water Act statutory requirement to develop TMDLs for impairments listed on a state's § 303(d) list. The specific impairments (water body segments and cause) are:

<u>Water Body Name</u>	<u>WBID</u>	<u>Cause</u>
Arkansas River	KS-LA-10-524_1	Biology
Arkansas River	KS-LA-10-524_3	Biology
Cow Creek	KS-LA-11-287_1755	Biology

The EPA has completed its review of the TMDL document with supporting documentation and information. By this letter, the EPA approves the submitted TMDLs. Enclosed with this letter is the Region 7 TMDL Decision Document which summarizes the rationale for the EPA's approval of the TMDLs. The EPA believes the separate elements of the TMDLs described in the enclosed document adequately address the cause of concern, taking into consideration seasonal variation and a margin of safety.

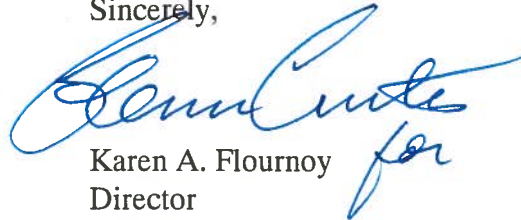
Although the EPA does not approve the monitoring or implementation plans submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDL and determine if future revisions are necessary or appropriate to meet applicable water quality standards. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in these TMDLs. Therefore, the implementation plan in this TMDL document provides information regarding implementation efforts to achieve the loading reductions identified.



The EPA is currently in consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service regarding this TMDL document. While we are approving these TMDLs at the present time, we may decide that changes to the TMDL document are warranted based upon the results of the consultation when it is completed.

The EPA appreciates the thoughtful effort that the KDHE has put into these TMDLs. We will continue to cooperate with and assist, as appropriate, in future efforts by the KDHE to develop TMDLs.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karen A. Flourney", with a stylized flourish at the end.

Karen A. Flourney
Director
Water, Wetlands and Pesticides Division

Enclosure

cc: Mr. John Mitchell, Director, Division of Environment, KDHE

Mr. Tom Stiles, Chief, Watershed Planning, Monitoring and Assessment Section, KDHE



EPA Region 7 TMDL Review

TMDL ID: KS-LA-10-524_03

State: KS

Document Name: ARKANSAS RIVER

Basin(s): LOWER ARKANSAS BASIN

HUC(s): 11030010, 11030011

Water body(ies): ARKANSAS R, COW CR

Tributary(ies): COW CREEK (1), COW CREEK (1755), SALT CREEK (7), SAND CREEK

Pollutant(s): BIOLOGY (LISTED CAUSE), NITROGEN, TOTAL, PHOSPHORUS, TOTAL

Submittal Date: 9/27/2013

Approved: Yes

Submittal Letter and Total Maximum Daily Load Revisions

The state submittal letter indicates final TMDL(s) for specific pollutant(s) and water(s) were adopted by the state, and submitted to the EPA for approval under Section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by the EPA, date of receipt of any revisions and the date of original approval if submittal is a revised TMDL document.

The TMDL document for biology was submitted by the Kansas Department of Health and Environment as an email attachment on September 27, 2013. After comments from the U. S. Environmental Protection Agency, a modified final submittal was received as an email attachment on December 24, 2013 and January 8, 2014.

A previous TMDL document was approved by the EPA on August 3, 2007, for Arkansas River for biology. Updates to the original biology TMDL document are included in this submittal and should be considered a revised TMDL. Both TMDL documents allocate loads for total phosphorus and total nitrogen.

Water Quality Standards Attainment

The targeted pollutant is validated and identified through assessment and data. The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. The TMDL(s) and associated allocations are set at levels adequate to result in attainment of applicable water quality standards [40 CFR § 130.7(c)(1)]. A statement that the WQS will be attained is made.

Aquatic life support on the Arkansas River, segments 1 and 3, are impaired due to nutrient enrichment. Four biological metrics including Kansas Biotic Index-Nutrient Oxygen Demand; Macroinvertebrate Biotic Index; Ephemeroptera, Plecoptera and Trichoptera Index; and Ephemeroptera, Plecoptera and Trichoptera Percentage Indices were examined to determine the level of biological impairment at SB283 using 29 samples from 1982 to 2011. All measure different aspects of community structure and have generally indicated biological impairment. Since the previous TMDL document, all indices have shown tendencies of deteriorating biological integrity in the river although the average difference before and after 2006 are not statistically significant.

In order to meet the desired endpoint target of all four biological metrics reflecting full aquatic support values, the KDHE established a set of staged nutrient concentration goals that are adjusted for flow conditions. The current initial endpoints reflect expected nutrient reductions from operational changes at upstream point sources as directed by their 2013 National Pollutant Discharge Elimination System permits. Responses to stream biologic communities to these reductions indicated by concentrations approaching the initial endpoints will be noted over 2014 to 2016 and used to reset the stream nutrient endpoints with a 2016 TMDL document revision.

During high flow events, bedload moves and dislodges benthic algae and periphyton preventing large mats from accumulating. During moderate flow events, nutrient loads move downstream faster than the uptake capacity of benthic primary producers. For these reasons, nutrient concentration goals were set to 0.29 milligram per liter for

total phosphorous and 2.9 mg/L total nitrogen for 51 to 100 percent flow events which are less than the average TP and TN values over the period of record. In the 2007 TMDL document, this represented a 30 percent reduction in the average nutrient load.

At median and low flows of 0 to 50 percent flow events, values derived from the average of the lowest 25 percent values of spring and summer TN and TP from streams in Ecoregion V - Subregion 27 with predominantly low flow were used. The resulting average values are 1.16 mg/L TN and 225 micrograms per liter TP. These concentrations are lower than the suggested levels recommended by Dodds and other authors in 1988 for streams at the mesotrophic-eutrophic threshold. The KDHE anticipates these lower flows are more influential to aquatic life support as periphyton and algae growth is greatest with high light availability, elevated nutrients and stable, low flows.

Reductions of nutrient concentrations should reduce the production of undesirable quantities or kinds of aquatic life, including algae and periphyton, with a concurrent restructuring of the macroinvertebrate community to one that is composed primarily of high water quality species and meets the KDHE indicators for full support designations.

In the current TMDL document, the resulting loading capacity at the 50 percent flow exceedance is 310 pounds per day TP and 2,500 lb/day TN. In the original TMDL document, no specific LCs were given for the calculated load duration curves and no flows were given with which to calculate an example LC for comparison. It can be surmised that given the nutrient concentration endpoints are the same, the LC would be essentially the same.

The EPA agrees that the TMDLs are set at a level adequate to result in attainment of applicable water quality standards.

Designated Use(s), Applicable Water Quality Standard(s) and Numeric Target(s)

The submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria, and a numeric target. If the TMDL(s) is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The designated uses for Arkansas River segment 1 include special aquatic life support, primary contact recreation B, drinking water supply, food procurement, groundwater recharge, irrigation water, industrial water and livestock water. Uses for Arkansas River segment 3 and Cow Creek 1755 are the same except for including expected aquatic life support instead of special aquatic life support.

The KDHE identified the applicable water quality criteria established for protection of beneficial uses as follows:

"Nutrients – Narrative: The introduction of plant nutrients into streams, lakes or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life. (K.A.R. 28-16-28e(c)(2)(A))."

The desired TMDL endpoint will be a macroinvertebrate community reflecting full support values of all four biological metrics at SB283: Kansas Biotic Index-Nutrient Oxygen Demand; Macroinvertebrate Biotic Index; Ephemeroptera, Plecoptera and Trichoptera Index; and Ephemeroptera, Plecoptera and Trichoptera Percentage Indices. To achieve these, staged nutrient concentration goals were estimated that would fully support aquatic life.

Two levels of nutrient concentrations based on flow were established to guide load reductions. For higher flow events at 51 to 100 percent flow, nutrient concentration goals were set to 0.29 milligram per liter for total phosphorus and 2.9 mg/L total nitrogen which are less than the average TP and TN values over the period of record.

At median and low flows of 0 to 50 percent flow, values derived from the average of the lowest 25 percent values of spring and summer TN and TP from streams in Ecoregion V - Subregion 27 with predominantly low flow were used. The resulting average values are 1.16 mg/L TN and 225 micrograms per liter TP. In addition, these concentrations are lower than the suggested levels recommended by Dodds and other authors in 1988 for streams at the mesotrophic-eutrophic threshold. The KDHE anticipates these lower flows are more influential to aquatic life support as excessive periphyton and algae growth is greatest with high light availability, elevated nutrients and stable, low flows.

Load duration curves were calculated at SB283 using the most recent 15 years of flow record from U.S.G.S. gage 07143330 and these levels of nutrient concentrations.

These targets and resulting load capacities will result in the water body meeting water quality standards and supporting all uses. The EPA agrees this is an appropriate translator of the narrative water quality standards.

Pollutant(s) of Concern

A statement that the relationship is either directly related to a numeric water quality standard, or established using surrogates and translations to a narrative WQS is included. An explanation and analytical basis for expressing the TMDL(s) through surrogate measures, or by translating a narrative water quality standard to a numeric target is provided (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae). For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and a margin of safety that do not exceed the loading capacity. If the submittal is a revised TMDL document, there are refined relationships linking the load to water quality standard attainment. If there is an increase in the TMDL(s), there is a refined relationship specified to validate that increase (either load allocation or wasteload allocation). This section will compare and validate the change in targeted load between the versions.

There is an established link between the narrative water quality standard for nutrients, the numeric values of all four biological metrics reflecting a fully supported macroinvertebrate community and numeric total phosphorus and total nitrogen targets. Consistent fully supporting scores for the four biological metrics will indicate nutrients entering the river from artificial sources have been controlled and are preventing the accelerated succession or replacement of aquatic biota and the production of undesirable quantities or types of aquatic life.

Two levels of nutrient concentrations based on flow were established to guide load reductions and calculate load duration curves. For higher flow events at 51 to 100 percent flow, nutrient concentration goals were set to 0.29 milligram per liter for total phosphorus and 2.9 mg/L total nitrogen which are less than the average TP and TN values over the period of record. These values are 30 percent lower than the average nutrient load in the 2007 TMDL document. At median and low flows at 0 to 50 percent flow, values derived from the average of the lowest 25 percent values of spring and summer TN and TP from streams in Ecoregion V - Subregion 27 with predominantly low flow were used. The resulting average values are 1.16 mg/L TN and 225 micrograms per liter TP. In addition, these concentrations are lower than the suggested levels recommended by Dodds and other authors in 1988 for streams at the mesotrophic-eutrophic threshold. The KDHE anticipates these lower flows are more influential to aquatic life support as excessive periphyton and algae growth is greatest with high light availability, elevated nutrients and stable, low flows.

The current TMDL document includes higher wasteload allocations than in the 2007 TMDL document; these represent a correction and improvement in the values provided in the 2007 TMDL document. The previous WLAs were computed using actual average flows while the revised WLAs reflect correct use of the design flows from the city of Hutchinson, city of South Hutchinson and Reno County Sewer District facilities. Additionally, WLAs are provided for mistakenly omitted facilities at Fun Valley and for urban storm water covered by the city of Hutchinson's municipal separate storm sewer National Pollutant Discharge Elimination System permit.

In the current TMDL document, the resulting loading capacity at the 50 percent flow exceedance is 310 pounds per day TP and 2,500 lb/day TN. In the previous TMDL document, no specific LCs were given for the calculated load duration curves and no flows were given with which to calculate an example LC for comparison. It can be surmised that given the nutrient concentration endpoints are the same, the LC would be the same.

Source Analysis

Important assumptions made in developing the TMDL document, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. The submittal demonstrates all significant sources have been considered. If this is a revised TMDL document any new sources or removed sources will be specified and explained.

In the absence of a national pollutant discharge elimination system permit, the discharges associated with sources were applied to the load allocation, as opposed to the wasteload allocation for purposes of this TMDL document. The decision to allocate these sources to the LA does not reflect any determination by the EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing

these TMDL(s) with some sources treated as LAs, the EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the allocated pollutant in this TMDL document are found to be, or become, NPDES-regulated discharges, their loads must be considered as part of the calculated sum of the WLAs in this TMDL document. Any WLA in addition to that allocated here is not available.

This TMDL document focuses on the three HUC 12 subwatersheds in the immediate vicinity of the city of Hutchinson. This target area is 107 square miles with 62.4 percent cropland, 17.2 percent urban and developed, 16.9 percent grassland and pasture and 2.2 percent woodland and forest land uses. Using data from monitoring sites SC523 and SC522, which are upstream on the Arkansas River, upstream nutrient concentrations typically exceed the endpoints set in this TMDL document. Groundwater is also anticipated to be a likely source and have accumulated nutrients that will require longer mitigation periods than surface runoff.

All National Pollutant Discharge Elimination System permittees within the three subwatersheds are listed in Appendix C. There are two municipal wastewater treatment facilities. The city of Hutchinson facility (KS0036188) has a design flow of 8.3 million gallons per day with an average daily discharge of 4.70 MGD. There have been marked increases in effluent nutrient content since 2011. For 2012 through 2013, concentrations averaged 21.11 milligrams per liter total nitrogen, 6.22 mg/L nitrate and 2.40 mg/L total phosphorus. The city of South Hutchinson facility (KS0095711) has a design flow of 2.0 MGD with an average daily discharge of 0.65 MGD. There are also two lagoon systems: Fun Valley Wastewater Lagoons (KS0080586) and Reno County Sewer District #202 (KS0091715) with potential discharges of 0.008 and 0.02 MGD, respectively. It is not anticipated that the lagoons will contribute significantly to nutrient loads. The city of Hutchinson also has a phase II NPDES municipal separate storm sewer system storm water permit (KSR044009). All other NPDES facilities within the area do not discharge by design. By type there are four cooling facilities, two salt producers, five non-discharging and three groundwater remediation sites.

There are 27 confined animal feeding operations with the dominant facility type being 20 dairies with 0 to 299 animals, 3 beef with 0 to 299 animals, 2 beef with 300 to 999 animals, 1 swine with 300 to 999 animals and 1 horse operation with 0 to 299 animals. All facilities are listed with more detailed information in Appendix B. All permitted livestock facilities have waste management systems designed to minimize runoff entering their operations or detaining runoff emanating from their areas. Such systems are designed for a 25-year, 24-hour rainfall/runoff event, which would be indicative of flow durations well under 10 percent of the time. The actual number of animal units on site is variable but typically less than permitted numbers.

Any CAFO that does not obtain an NPDES permit must operate as a no discharge facility. Any discharge from an unpermitted CAFO is a violation of Section 301. It is the EPA's position that all CAFOs should obtain an NPDES permit because it provides clarity of compliance requirements, authorization to discharge when the discharges are the result of large precipitation events, for example, in excess of 25-year, 24-hour frequency/duration or are from a man-made conveyance. Permitted CAFOs identified in this TMDL are part of the assigned wasteload allocation. Animal feeding operations and unpermitted CAFOs are considered under the load allocation because there is currently not enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL document does not reflect a determination by the EPA that such facility does not meet the definition of a CAFO nor that the facility does not need to obtain a permit. To the contrary, a CAFO that discharges has a duty to obtain a permit. If it is determined that any such operation is a CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in this TMDL document as approved.

The current TMDL document identifies two missed NPDES permits when compared to the previous TMDL document. The KDHE has agreed to a more thorough appraisal of sources in the 2016 TMDL document. The EPA agrees that the TMDL document considers all known major sources.

Allocation - Loading Capacity

The submittal identifies appropriate loading capacities, wasteload allocations for point sources and load allocations for nonpoint sources. If no point sources are present, the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a revised TMDL document the change in loading capacity will be documented in this section. All TMDLs must give a daily number. Establishing TMDL "daily" loads consistent with the U.S. Court of Appeals for the D.C. circuit decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015, (April 25, 2006).

Two levels of nutrient concentrations based on flow were established to guide load reductions and calculate load duration curves. For higher flow events at 51 to 100 percent flow, nutrient concentration goals were set to 0.29 milligram per liter for total phosphorus and 2.9 mg/L total nitrogen. At median and low flows of 0 to 50 percent

flow, values were set to 1.16 mg/L TN and 225 micrograms per liter TP.

In the current TMDL document, the resulting loading capacity at the 50 percent flow exceedance is 310 pounds per day TP and 2,500 lb/day TN. In the previous TMDL document, no specific LCs were given for the calculated load duration curve and no flows were given with which to calculate an example LC for comparison. It can be surmised that given the nutrient concentration endpoints are the same, the LC would be essentially the same.

Wasteload Allocation Comment

The submittal lists individual wasteload allocations for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to a water quality standard excursion, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLA. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a revised TMDL document, any differences between the original TMDL(s) WLA and the revised WLA will be documented in this section.

The wasteload allocations are based on design flows and expected nutrient concentrations of total phosphorus and total nitrogen. Following the Kansas Surface Water Nutrient Reduction Plan, the goals for wastewater treatment plants for the Hutchinson facilities will not exceed 1.5 milligrams per liter TP and 8 milligrams per liter TN. For the lagoons of Reno County and Fun Valley, a technology limit of 7 mg/L TP and 7 mg/L TN is assumed.

The resulting WLAs represent a correction and improvement in the values provided in the 2007 TMDL document. The previous WLAs were computed using actual average flows. The revised WLAs reflect correct use of the design flows from the city of Hutchinson, city of South Hutchinson and Reno County Sewer District #202 facilities. Additionally, WLAs are provided for mistakenly omitted facilities at Fun Valley and for urban storm water covered by the city of Hutchinson's municipal separate storm sewer system National Pollutant Discharge Elimination System storm water permit. Previous WLAs in the 2007 TMDL document were 0.5 lb/day TP and 1.5 lb/day TN for Reno County Sewer District #202 (KS0091715), 8 lb/day TP and 49 lb/day TN for the city of South Hutchinson (KS0095711) and 59 lb/day TP and 315 lb/day TN for the city of Hutchinson (KS0036188).

Table 1. National Pollutant Discharge Elimination System Permittees with Individual Wasteload Allocations in the Current Arkansas River TMDL Document.

Facility Name	NPDES Permit Number	Design Flow (MGD)*	TP WLA (lb/day)**	TN WLA (lb/day)***
Reno County Sewer District #202	KS0091715	0.02	0.33	1.17
Fun Valley Wastewater Lagoons	KS0080586	0.008	0.13	0.47
City of South Hutchinson	KS0095711	2	25	134
City of Hutchinson	KS0036188	8.3	104	555

*MGD = million gallons per day

**TP WLA = total phosphorus wasteload allocation in pounds per day

***TN WLA = total nitrogen wasteload allocation in pounds per day

In order to calculate the WLA for the city of Hutchinson's municipal separate storm system storm water permit, the proportion of runoff from the Hutchinson jurisdictional limits was calculated. Although this TMDL document considers the three HUC 12 subwatersheds within the immediate vicinity of Hutchinson, a total of 13 HUC 12 subwatersheds had to be considered as contributing to Arkansas River flow between the upstream gage at Nickerson, Kansas and the downstream gage at Hutchinson, Kansas. Urban and developed land use within these 13 subwatersheds is 3.25 percent. Also, concurrent flow measurements at the two gages indicate that 60 percent of flow comes from upstream and 40 percent of the flow originates from the 13 subwatersheds. Since these TMDLs focus on local contributions and impacts, the WLA for the city of Hutchinson MS4 storm water permit was calculated as 3.25 percent of the intervening 40 percent of the load allocation occurring at flows greater than median flow. It is assumed that storm water is an insignificant contributor at flows less than median flow.

All other NPDES permittees, including confined animal feeding operations within the area covered by this TMDL document do not discharge by design, are listed in Appendices B and C and given a WLA of zero for TN and TP. These also had TP and TN WLAs of zero in the 2007 TMDL document.

In the original TMDL document, the total WLA was 67.5 lb/day TP and 365.5 lb/day TN. The total WLA in the current TMDL document is 130 lb/day TP and 690 lb/day TN. The MS4 WLA is 2 lb/day TP and 24 lb/day TN at the 50 percent flow exceedance. Mistakenly, no MS4 WLA was provided in the original TMDL document.

Load Allocation Comment

All nonpoint source loads, natural background and potential for future growth are included. If no nonpoint sources are identified, the load allocation must be given as zero [40 CFR § 130.2(g)]. If this is a revised TMDL document, any differences between the original TMDL(s) LA and the revised LA will be documented in this section.

The load allocation varies with flow and is equal to the amount of loading capacity that remains after accounting for the wastewater wasteload allocation and the storm water municipal separate storm sewer system WLA. At the 50 percent flow exceedance, the LA is 178 pounds per day total phosphorus and 1,786 lb/day total nitrogen.

In the previous TMDL document, no specific LAs were given for the calculated load duration curve and no flows were given with which to calculate an example LA for comparison. It can be surmised that with the same nutrient concentration endpoints, a smaller total WLA and no MS4 WLA, the LA would have been larger in the previous TMDL.

Margin of Safety

The submittal describes explicit and/or implicit margins of safety for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a revised TMDL document, any differences in the MOS will be documented in this section.

The calculation and use of multiple biological metrics provides an implicit margin of safety that aquatic life support has been fully attained and the designated use has been restored. A consistently compliant suite of scores for Kansas Biotic Index-Nutrient Oxygen Demand; Macroinvertebrate Biotic Index; Ephemeroptera, Plecoptera and Trichoptera Index; and Ephemeroptera, and Plecoptera and Trichoptera Percentage Indices will be regarded as the requisite criteria for this TMDL. Fully supporting scores for these metrics will demonstrate that plant nutrients entering the river from artificial sources have been controlled and are preventing the accelerated succession or replacement of aquatic biota and the production of undesirable quantities or types of aquatic life.

Seasonal Variation and Critical Conditions

The submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of the WQS. If this is a revised TMDL document, any differences in conditions will be documented in this section.

Seasonal variation was accounted for by using load duration curves where the TMDL is applicable at all flows under all conditions. Additionally, two levels of nutrient concentrations based on flow were established to guide load reductions. For higher flow events at 51 to 100 percent flow, nutrient concentration goals were set to 0.29 milligram per liter for total phosphorous and 2.9 mg/L total nitrogen. At median and low flows of 0 to 50 percent flow, values derived from the average of the lowest 25 percent values of spring and summer TN and TP from streams in Ecoregion V - Subregion 27 with predominantly low flow were used. The resulting average values are 1.16 mg/L TN and 225 micrograms per liter TP.

The critical condition has been considered by setting nutrient endpoints for low flows lower than for high flows. This reflects the relative importance of low flow periods for benthic primary production. In addition, the TMDL document acknowledges that it is estimating the reduction in nutrients required to return the Arkansas River to full support of aquatic life as measured by the four biological matrices.

Public Participation

The submittal describes required public notice and public comment opportunities, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

To convey information to the public, an active internet website was established at <http://www.kdheks.gov/tmdl/index.htm> on the general establishment of TMDLs and for these specific TMDLs in the Lower Arkansas Basin. The Lower Arkansas Advisory Committee met to discuss these TMDLs on May 31, 2012, in Hutchinson, September 12, 2012, in Halstead, April 3, 2013, and July 19, 2013, in Hutchinson. A public hearing for this TMDL document was held on September 4, 2013, in Newton. The record was held open until September 27, 2013; no comments were received on this TMDL document.

Monitoring Plan for TMDL(s) Under a Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards, and a schedule for considering revisions to the TMDL(s) (where a phased approach is used) [40 CFR § 130.7]. If this is a revised TMDL document, monitoring to support the revision will be documented in this section. Although the EPA does not approve the monitoring plan submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDLs and determine if future revisions are necessary or appropriate to meet applicable water quality standards.

Since the first TMDL document was approved in 2007, the KDHE sampled for total nitrogen at SC524 and SC287 through 2012 with one macroinvertebrate sample each summer of 2009, 2010 and 2011. The KDHE will continue to monitor stream chemistry quarterly, including total nutrient concentrations, at SC524, SC523, SC287 and SC522 and quarterly once every four years at SC659. Stream biology macroinvertebrates will continue to be collected at SB283 in attempted annual visits. Wastewater discharges in the area covered by this TMDL document will continue to be required to monitor for total nutrient concentrations.

Prior to 2016, the KDHE will evaluate all new biological samples and determine if the river is fully supporting aquatic life as indicated by the suite of metrics defined in the margin of safety. In 2016, the phosphorus portion of this TMDL document will transition into a new TMDL document for stream phosphorus for this reach of the Arkansas River with updated endpoints and allocations. At that time, this biology TMDL document will also be revised to address any total nitrogen loadings.

Reasonable Assurance

Reasonable assurance only applies when less stringent wasteload allocation are assigned based on the assumption that nonpoint source reductions in the load allocation will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads. States are not required under Section 303(d) of the Clean Water Act to develop TMDL implementation plans and the EPA does not approve or disapprove them. However, this TMDL document provides information regarding how point and nonpoint sources can or should be controlled to ensure implementation efforts achieve the loading reductions identified in this TMDL document. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in this TMDL document. Therefore, the discussion of reduction efforts relating to point and nonpoint sources can be found in the implementation section of the TMDL document, and are briefly described below.

The states have the authority to issue and enforce state operating permits. Inclusion of effluent limits into a state operating permit and requiring that effluent and instream monitoring be reported to the state should provide reasonable assurance that instream water quality standards will be met. Section 301(b)(1)(C) requires that point source permits have effluent limits as stringent as necessary to meet WQS. However, for wasteload allocations to serve that purpose, they must themselves be stringent enough so that (in conjunction with the water body's other loadings) they meet WQS. This generally occurs when the TMDL(s)' combined nonpoint source load allocations and point source WLAs do not exceed the WQS-based loading capacity and there is reasonable assurance that the TMDL(s)' allocations can be achieved. Discussion of reduction efforts relating to nonpoint sources can be found in the implementation section of the TMDL document.

These TMDLs will be a medium priority for implementation with ongoing assessments to determine the aquatic community response to nutrient loading and as the city of Hutchinson facility works to improve the nutrient concentrations in their outfall. The TMDL document lists a variety of authorities, programs and agencies that may be used to direct activities in the watershed to reduce pollution.

Priority for nutrient reduction efforts will be on lands adjacent to the main stem river and tributary segment included in this TMDL document. Emphasis will be placed on implementing best management practices for nutrient reduction in agricultural and urban areas. Primary participants for implementation include the city of Hutchinson and its residents and agricultural producers operating within the subwatershed drainage. Desired activities include: monitoring wastewater discharges, repair or replace faulty septic systems, improve riparian conditions, implement soil sampling for appropriate fertilizer application, maintain conservation tillage and contour farming, install grass buffer strips along low order streams, install proper manure storage, implement nutrient management plans to manage manure application, implement urban storm water BMPs and implement urban watershed outreach programs.

The primary delivery agents for program participation will be the KDHE Municipal Program Section, the Reno

County Conservation District for programs of the State Department of Agriculture - Conservation Division and the Natural Resources Conservation Service. Producer outreach and awareness will be delivered by the Kansas State Extension and agricultural interest groups such as the Kansas Farm Bureau, the Kansas Livestock Association and grain crop associations. On-site waste system inspections will be performed by Local Environmental Protection Program personnel for Reno County.

Funding is available through the State Revolving Loan Fund operated through the Municipal Program at the KDHE and provides low interest loans for wastewater treatment improvement. Since its inception, \$750 million in loans have been made to municipal dischargers in the state. The Nonpoint Source Pollution Control Fund of the State Conservation Commission distributes \$2.8 million annually to the 105 Conservation Districts to implement nonpoint source abatement practices, including repair and replacement of faulty septic systems and riparian area improvements.